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Title: Method of treating a sheet with a coating composition.

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PATENT- OG VAREMÆRKESTYRELSEN

METHOD OF TREATING A SHEET WITH A COATING COMPOSITION

DESCRIPTION

BACKGROUND OF THE INVENTION

The present invention relates to protection against pollution, wear by weather, graffiti, anti-fouling, bird droppings etc. by providing a method of treating a sheet with a coating composition and using the sheet for a protecting purpose. This can be accomplished either by treating a sheet with said method and thereby applying the sheet to the surface to be protected or by treating a sheet already applied to the surface to be protected with said method.

Sheets made of polymer materials are used in many aspects of the everyday life to display graphics on buses, cabs, and buildings. The sheets will meet requirements of durability, resistance and protection. The sheets may also be for indoor use. Several types of sheets exist on the market for the above-mentioned purposes of protection and advertising, etc. These sheets are often laminated to comprise a liner, an adhesive layer and a film, which film constitutes the outer surface. Also, sheets exists for the purpose of protecting surfaces, such as the front of a building, windows, road signs, tarpaulins, underwater structures. These sheets are also subject to the invention of protecting surfaces by treatment with a coating composition.

The Technical Field

The present invention relates to a method of applying a coating of a polyolefin wax to a sheet. The application of the polyolefin wax to the sheet involves providing a coating composition comprising particles of a polyolefin wax suspended in a liquid to the sheet followed by an evaporating of the liquid and a heat treatment to bring the wax particles into a coalescing state and allowing the wax particles to provide a continuous coating of the sheet and allowing the coating to consolidate to a protective coating.

DISCLOSURE OF THE INVENTION

Object of the Invention

It is an object of the present invention to provide an improved method of protection against graffiti, pollution and corrosion.

It is an object of the present invention to provide an improved method of treating a surface of a sheet, in particular to provide an improved method of providing a surface of a sheet with a protecting coating.

Another object of the present invention is to provide a method of producing a coated sheet, in particular to provide an improved method of producing a sheet with a protecting coating.

Another object is to provide an improved method of protecting a surface of a structure, in particular to provide an improved method of coating a sheet on the structure.

In particular, it is an object of the present invention to provide improved methods of:
providing a surface of a sheet with an essentially permanent anti-graffiti coating;
providing a surface of a sheet with an essentially permanent coating protecting against pollution and corrosion.

Another object of the present invention is to provide a coating composition, in particular an anti-graffiti coating composition, which is inexpensive to manufacture, easy to apply, and environmentally safe in use.

Further objects appear from the description elsewhere.

Solution According to the Invention

According to an aspect of the present invention, these objects may be obtainable by providing:

a method of treating a sheet comprising the steps of

- providing a coating composition comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase;
- applying said coating composition to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition; and
- subjecting said dried, applied coating composition to a heating treatment to coalesce said wax particles;

and/or

a method of producing a coated sheet comprising the steps of

- applying a coating composition in the form of a suspension comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition;
- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the sheet; and

allowing said heat treated coating composition to consolidate to a protective coating;

and/or

a method of providing a surface of a structure with a protecting coating by coating a sheet on the structure comprising the steps of

- applying a coating composition in the form of a suspension comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase to the sheet;
- evaporating said liquid phase from the applied coating composition;
- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the sheet; and

allowing said heat treated coating composition to consolidate to a protective coating.

The polyolefin wax may be the polyolefin wax as disclosed in pending Danish patent application no. DK PA 2002 01135; in pending Danish patent application no. DK PA 2003 XXXXX (same applicant and same date of filing as present application); and in pending Danish patent application no. DK PA 2003 YYYYY (same applicant and same date of filing as present application), which applications both hereby are incorporated by reference.

In one embodiment two or more coatings are applied to a sheet, and one coating is applied to another coating and so forth for any other coatings.

The sheet comprises one or more films and it may also comprise an adhesive layer and a liner.

In one embodiment the sheet is a laminated structure.

In one embodiment the sheet is a film.

The adhesion of a film to a structure may be effected by e.g. surface tension properties and/or electrostatic properties of the film without a dedicated adhesive layer present.

In one embodiment the sheet is comprising an adhesive layer having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and a film having a first major film side and a second major film side, said second major film side being bonded to the first major adhesive layer side; and the coating composition being applied to said first major film side.

The term above "bonded to" means: a film and an adhesive layer is adhering to each other and the adhesive layer is covering the film side completely or almost completely such that essentially the full surface area of one of the two film sides of the film is in contact with essentially the full surface area of one of the two adhesive layer sides of the adhesive layer. The term "being bonded to" may in similar way as defined above also define a relationship between one side of one film and one side of another film with the exception that the forces between two such film sides may be of a different magnitude and nature than for the case of a film and an adhesive layer. Furthermore, the term "being bonded to" may in similar way as defined above also define a relationship between a major sheet surface and a surface of a liner with the exception that the forces between two such surfaces may be of a different magnitude and nature than for the case of a film and an adhesive layer.

In one embodiment the sheet is comprising an adhesive layer having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and a film having a first major film side and a second major film side, said second major film side being bonded to the first major

adhesive layer side; and the coating composition being applied to said first major film side. In this embodiment the film has substantially a thickness of 0.025 mm and is made essentially of polyester and the thickness of the sum of the film and the adhesive layer is substantially 0.050-0.075 mm and the adhesive is pressure sensitive.

In one embodiment the sheet is comprising an adhesive layer having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and two or more films each having a first major film side and a second major film side; and each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film side bonded to the first major adhesive layer side; and the topmost film side is subjected to said method of coating.

In one embodiment the sheet is comprising an adhesive layer having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and two or more films each having a first major film side and a second major film side; and each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film side bonded to the first major adhesive layer side; and the topmost film side is subjected to said method of coating, and the second major adhesive layer side is applied to a structure.

When a sheet of this embodiment is applied to a structure it may in the course of time be preferred to expose another film layer in the stack of film layers. E.g., the topmost film layer treated to form a coating on the topmost film side may be removed, in part or fully, from the stack to expose a non-treated film layer. The non-treated film layer may thereafter be subject to said method of coating. In this way a renewal of a coated film layer may take place without the application of a

new sheet to the structure. The adhesion force between such two film sides is of a magnitude such that a manual removal of one film adhered to another may be carried out by hand.

In one embodiment the sheet is comprising two or more pairs of layers, each pair of layers comprising an adhesive layer having a first major adhesive layer side and a second major adhesive layer side, and a film having a first major film side and a second major film side with the second major film side bonded to the first major adhesive layer side; and each pair of layers is stacked upon another pair of layers such that a second major adhesive layer side of a pair above is bonded to a first major film side of a pair of layers below; and the topmost film side is subjected to said method of coating.

In one embodiment the sheet comprises one film with a first major film side and a second major film side; and the first major film side and the second major film side are subjected to said coating method.

In one embodiment the film further comprises one or more of the applicable substances selected from the group of laquer, overprint clear, clearcoat or backing, and combinations thereof, applied to a major film side. In this embodiment the sheet may be applied after being subject to said method of coating, preferably may be applied followed by being subjected to said method of coating, to surfaces with a high wear rate, as e.g. floors in heavily trafficked areas.

In one embodiment the sheet has a thickness of between 20 microns and 8000 microns, preferably between 30 microns and 5000 microns, more preferably between 30 microns and 2000 microns, even more preferably between 30 microns and 500 microns.

In one embodiment the film has a thickness of between 20 microns and 4000 microns, preferably between 20 microns and 2000 microns, more preferably be-

tween 20 microns and 500 microns, even more preferably between 20 microns and 250 microns.

The film is made of a material selected from the group consisting of polyester, polycarbonate, acrylic, polyurethanes, polyacetyl, polyolefin based ionomers, ethylene vinyl acetate polymers, polyethylene, polypropylene, polyvinyl chloride, polystyrene, urethane acrylate polymers, epoxy polymers, epoxy acrylate polymers, and mixtures thereof, preferably said material is selected from the group consisting of polyester, acrylic, polyethylene, polypropylene, polyvinyl chloride, polystyrene, and mixtures thereof, more preferably said material is selected from the group consisting of polyester and polyvinyl chloride and mixtures thereof.

The film may be tinted or dyed, and it may be colorless, clear, opaque or transparent. In one aspect of the invention the graphic is printed on the film with one of many techniques for applying a graphic to a film, e.g. electrostatic printing, piezo ink jet printing, offset printing, screen printing or thermal ink jet printing. In one embodiment the film is essentially a polyester film. In one embodiment the film is essentially a vinyl film.

The adhesive layer is made of a material selected from the group consisting of acrylics, rubbers, polyolefins and mixtures thereof. The adhesive layer may be pressure-sensitive or non-pressure-sensitive. In one embodiment the adhesive layer is pressure-sensitive.

In one embodiment the adhesive layer further comprises one or more substances selected from the group consisting of tackifiers, oils, stabilizers, flame-retardants, UV-light absorbers and mixtures thereof.

In one embodiment the adhesive layer has a thickness of between 5 microns and 150 microns, preferably between 10 microns and 50 microns, more preferably between 10 microns and 25 microns.

The sheet may be prepared in several ways. The bonding layer may be extrusion coated and thereafter dried and/or cured.

In one embodiment of the invention an article comprising a sheet is produced by the method of producing a coated sheet according to claim 2.

In one embodiment of the invention an article comprising a sheet is produced by the method of producing a coated sheet according to claim 2, which article further comprises a liner bonded to a major sheet surface.

The liner comprises a material selected from the group of kraft paper, polyethylene coated paper, polymer liner.

In one embodiment of the invention the article is provided as a roll.

In one embodiment of the invention the article is provided as a separate sheet. A separate sheet is defined as a sheet, which can be manipulated without the necessity of major modifications prior to applying the sheet, such as dividing the sheet. A separate sheet may though be manipulated with minor modifications after the application of the sheet, such as cutting smaller pieces of the sheet.

In one embodiment the sheet consists of a film on top of an adhesive layer, which adhesive layer is on top of a liner.

In one embodiment a structure has been covered fully or in part with an article of claim 11, wherein the structure is selected from the group consisting of buildings, parts of buildings, elevators, windows, doors, tiles, walls, partitions, furniture, signs, bill boards, artwork, vehicles.

In one embodiment the structure is according to claim 15 wherein the vehicle is selected from the group consisting of buses, trains, automobiles, subways-trains.

In one embodiment the use of an article of claim 11 is for providing a surface of a structure according to any of claims 15-16 with an essentially permanent anti-graffiti coating.

In one embodiment the use of an article of claim 11 is for providing a surface of a structure according to any of claims 15-16 with an essentially permanent coating protecting against pollution and corrosion.

In one embodiment a method according to claim 20 is provided.

In one embodiment a method according to claim 21 is provided.

In one embodiment a method according to claim 22 is provided.

In one embodiment a method according to claim 23 is provided.

In one embodiment a method according to claim 24 is provided.

In one embodiment a method according to claim 25 is provided.

In one embodiment a method according to claim 26 is provided.

In one embodiment a structure has been subjected to the method of any of claims 19-26, wherein the structure is selected from the group consisting of buildings, elevators, windows, doors, tiles, walls, partitions, furniture, signs, bill boards, artwork, vehicles.

In one embodiment the structure is according to claim 27 wherein the vehicle is selected from the group consisting of buses, train, automobiles, subways-trains.

In one embodiment the use of the method of any of claims 19-26 is for providing a surface of a structure according to any of claims 27-28 with an essentially permanent anti-graffiti coating.

In one embodiment the use of the method of any of claims 19-26 is for providing a surface of a structure according to any of claims 27-28 with an essentially permanent coating protecting against pollution and corrosion.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, by way of examples only, the embodiments of the present invention are further disclosed with detailed description of preferred embodiments. Reference is made to the drawings in which

Fig. 1a illustrates schematically a first type of a sheet;
Fig. 1b illustrates schematically the first type of a sheet with a coating;
Fig. 2 illustrates schematically a second type of a sheet;
Fig. 3 illustrates schematically a third type of a sheet;
Fig. 4 illustrates schematically a fourth type of a sheet with a coating;

DETAILED DESCRIPTION

Figure 1a illustrates a sheet 1 schematically in section side view. The sheet 1 consists of a film 3 on top of an adhesive layer 2. The film 3 and the adhesive layer 2 is bonded to each other and the sheet is shown as a laminated structure. The first major film side 4, which is also the topmost surface of the sheet, is also shown.

Figure 1b shows the sheet of figure 1a where a coating 5 has been applied to the first major film side 14, which is also the topmost surface of the sheet 11.

Figure 2 illustrates a sheet 101 schematically in section side view. The sheet 101 consists of two films 103 stacked upon each other to form a stack of films. The stack of films is on top of an adhesive layer 102. The major side of the above film of the stack is bonded to the major surface of the below film of the stack as well as the major side of the below film and the major adhesive layer side is bonded to each other. The sheet 101 is shown as a laminated structure. The topmost film surface is a major first film side 104 and is subject to a coating method.

Figure 3 illustrates a sheet 201 schematically in section side view. The sheet 201 consists of two pairs 205. Each pair 205 is shown identical and consists of a film 203 on top of an adhesive layer 202. The two pairs 205 are stacked upon each other with the film 203 of the below pair bonded to the adhesive layer 202 of the above pair. The topmost film surface is a major first film side 204 and is subject to a coating method.

Figure 4 illustrates a coated sheet 401 schematically in section side view. The sheet 401 consists of a coating 408 on top of a clearcoat 407. The clearcoat 407 is on top of a first major film side of a film 403, and the film 403 is on top of an adhesive layer 402, and the adhesive layer 402 is on top of a liner 406.

EXAMPLES

Preferred embodiments of the invention are further illustrated by examples which are for the purpose of illustration only and are in no way as to be considered limiting.

Example 1

Test 1.

A public bus from Marseilles' public transportation company had been applied with a decorative sheet of the brand 3M Scotchcal 639, High Gloss Overlaminate 639 covering all sides and doors of the bus.

A coating composition was prepared by mixing 10 g of polyethylene wax powder Davosi into 1 liter of ethanol 96%. The coating composition was applied by airless spray gun onto the sheet and dried for 3 hours. It was observed that when the ethanol had evaporated a white wax powder covered the surface of the sheet. Then the surface of the sheet was heated by a Ripack 2000 gas heated gun until the white wax powder was melting and become transparent. The quantity of polyethylene wax powder applied was $6.7 \cdot 10^{-5}$ ml/cm^2. The composition was cured/heated for 3 hours at 20 °C, 65% relative humidity.

A solvent-based graffiti paint was sprayed on to the coated surface in two areas approx. 0.1 m^2 and cured for 6 hours at 20 °C, 65% relative humidity.

Observations:

The graffiti paint in a first of the two areas was easily removed by a brush and lukewarm water as well as by high pressure cleaning (water, 90-100 bar).

After further 18 hours:

The graffiti paint in the second of the two areas was easily removed by a brush and lukewarm water as well as by high pressure cleaning (water, 90-100 bar).

Test 2.

Another test was carried out on a bus, which had been applied with a decorative sheet of the brand 3M Scotchcal 639, High Gloss Overlaminate 639 covering all sides and doors of the bus but the sheet was not coated as described in Test 1.

A solvent-based graffiti paint was sprayed on to the coated surface in two areas approx. 0.1 m^2 and cured for 6 hours at 20 °C, 65% relative humidity.

Observations:

After 6 hours the graffiti paint could partly be removed by hard mechanically brushing with a hard brush.

After further 18 hours

The graffiti paint could not be removed.

Example 2

A sheet 210 x 320mm, 3M Scotchcal 639, High Gloss Overlaminate 639 was coated with a pre-prepared coating composition.

The coating composition was prepared by mixing 7 g of polyethylene wax powder Davosi into 1 liter of ethanol 96%. The coating composition was applied by airless spray gun onto the sheet consisting of four part-areas denoted 1, 2, 3 and 4 such that the coating composition covered half of the sheet, namely the areas 1 and 2 and dried for 3 hours. It was observed that when the ethanol had evaporated a white wax powder covered the surface of the sheet. Then a Bosch air heated gun heated the surface of the sheet until the white wax powder was melting and become transparent. The composition was cured for 12 hours at 20 °C, 65% relative humidity. A solvent-based graffiti paint was sprayed on to the entire sheet surface, areas 1-4, and cured for 24 hours at 20 °C, 65% relative humidity.

The sheet was then bended resulting in several hard folds to examine the flexibility of the applied coating. The self-adhesive laminate was then applied on 1 mm steel plate.

Observations:

The graffiti paint in area 1 was easily removed by using a nail and a credit card. This also applied where the laminate had been folded.

In area 3 the graffiti paint was sticking harder to the surface, but could be removed by a nail and a credit card.

Continued test:
After another 24 hours an attempt to remove the graffiti paint in the areas 2 and 4 was made.

Observations:
The graffiti paint in area 2 was easily removed by using a nail and a credit card. This also applies to the "lines" where the folds where made.

The graffiti paint in area 4 could not be removed by using a nail or a credit card.

Example 3

A sheet of Blue Oracal Series 640 permanent foil was tested under same conditions as for the 3M 639 laminate described in Example 1.

The preparation of the coating composition was carried out as in Example 1:
A coating composition was prepared by mixing 7 g of polyethylene wax powder Davosi into 1 liter of ethanol 96%. The coating composition was applied by airless spray gun onto the sheet consisting of four part-areas denoted 1, 2, 3 and 4 such that the coating composition covered half of the sheet, namely the areas 1 and 2 and dried for 3 hours. It was observed that when the ethanol had evaporated a white wax powder covered the surface of the sheet. Then a Bosch air heated gun heated the surface of the sheet until the white wax powder was melting and become transparent. The composition was cured for 12 hours at 20 °C, 65% relative humidity. A solvent-based graffiti paint was sprayed on to the

entire sheet surface, areas 1-4, and cured for 24 hours at 20 °C, 65% relative humidity.

The sheet was then bended resulting in several hard folds to examine the flexibility of the applied coating. The self-adhesive laminate was then applied on 1 mm steel plate.

Observations:
The graffiti paint in area 1 was easily removed by using a nail and a credit card. This also applies to the "lines" where the folds where made.

In area 2 a nail or a credit card could not remove the graffiti paint.

Continued test:
After another 24 hours an attempt to remove the graffiti paint in the areas 2 and 4 was made.

Observations:
The graffiti paint in area 2 was easily removed by using a nail and a credit card. This also applies to the "lines" where the folds where made.

The graffiti paint in area 4 could not be removed by using a nail or a credit card.

Example 4

A sheet, 3M Scotchcal 639, High Gloss Overlaminate 639 could be coated with a coating composition prepared by mixing polyethylene wax powder Shamrock S-394 with a particle size of 5 microns with 1 liter of ethanol 96%. The coating composition could be applied by one or more airless spray guns onto the sheet in a continuous process allowing the sheet to be moved continuously into a spraying-zone for spraying the coating composition onto the sheet. After applica-

tion of the coating composition, the sheet-part emanating from the spraying-zone will enter a drying-zone where the ethanol will evaporate. Thereafter the sheet-part emanating from the drying-zone will enter a heating-zone where the particles of the coating composition will melt. Thereafter the sheet-part emanating from the heating-zone will enter a cooling-zone to let the melt composition solidify and form a substantially continuous coating on the sheet.

The coated sheet will thereafter be subjected to solvent-based graffiti paint. The paint will cure for 24 hours at 20 °C, 65% relative humidity.

Observations:
It will be found that the graffiti paint can be easily removed by a brush and luke-warm water as well as by high pressure cleaning (water, 90-100 bar).

Up to 50 repetitive layers of graffiti paint can be applied and removed on the same wax-coated sheet.

Example 5

A train wagon will be applied with a sheet as set forth in Example 1. A coating composition prepared as in Example 1 will be applied to the parts of the sheet-covered train wagon. Thereafter the sheet is subjected to the method in Example 1 of treating the surface.
The coated sheet will thereafter be subjected to a solvent-based graffiti paint. Thereafter, the paint will cure.

Observations:
It will be found that the graffiti paint can be easily removed by a brush and luke-warm water as well as by high pressure cleaning (water, 90-100 bar).

Up to 50 repetitive layers of graffiti paint can be applied and removed on the same wax-coated sheet.

Example 6

A sheet as set forth in Example 1 could be coated with a pre-prepared coating composition. The preparation of the coating composition is carried out as in Example 1. The coating composition could be applied by one or more airless spray guns onto the sheet. After application of the coating composition, the sheet is dried and the ethanol will evaporate. Thereafter the sheet is heat treated in order to melt the polyethylene particles. Thereafter the sheet is cooled to let the melt composition solidify and form a substantially continuous coating on the sheet.

The coated sheet will thereafter be subjected to solvent-based graffiti paint. The paint will cure for 24 hours at 20 degrees C, 65% relative humidity.

Observations:
It will be found that the graffiti paint can be easily removed by a brush and luke-warm water as well as by high pressure cleaning (water, 90-100 bar).

Up to 50 repetitive layers of graffiti paint can be applied and removed on the same wax-coated sheet.

CLAIMS

1. A method of treating a sheet comprising the steps of

- providing a coating composition comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase;
- applying said coating composition to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition; and
- subjecting said dried, applied coating composition to a heating treatment to coalesce said wax particles.

2. A method of producing a coated sheet comprising the steps of

- applying a coating composition in the form of a suspension comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase to at least one surface of the sheet;
- evaporating said liquid phase from the applied coating composition;
- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the sheet; and

allowing said heat treated coating composition to consolidate to a protective coating.

3. A method according to any of claims 1-2, wherein
the sheet is a film.

4. A method according to any of claims 1-2, wherein
the sheet 1 is comprising

an adhesive layer 2 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and
a film 3 having a first major film side 4 and a second major film side, said second major film side being bonded to the first major adhesive layer side; and the coating composition being applied to said first major film side 4.

5. A method according to any of claims 1-2, wherein
the sheet 101 is comprising
an adhesive layer 102 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and
two or more films 103 each having a first major film side and a second major film side; and
each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film side bonded to the first major adhesive layer side; and
the topmost film side 104 is subjected to said method of coating.

6. A method according to any of claims 1-2, wherein
the sheet 201 is comprising
two or more pairs of layers 205, each pair of layers 205 comprising
an adhesive layer 202 having a first major adhesive layer side and a second major adhesive layer side, and
a film 203 having a first major film side and a second major film side
with the second major film side being bonded to the first major adhesive layer side; and
each pair of layers 205 is stacked upon another pair of layers 205 such that a second major adhesive layer side of a pair above is bonded to a first major film side of a pair of layers 205 below; and
the topmost film side 204 is subjected to said method of coating.

7. A method according to any of claims 1-2 wherein the sheet comprises one film with a first major film side and a second major film side; and
the first major film side and the second major film side are subjected to said coating method.

8. A method according to any of claims 2-7 wherein the film further comprises one or more of the applicable substances selected from the group of laquer, overprint clear, clearcoat or backing, and combinations thereof, applied to a major film side.

9. A method according to any of claims 2-8 wherein the sheet has a thickness of between 20 microns and 8000 microns, preferably between 30 microns and 5000 microns, more preferably between 30 microns and 2000 microns, even more preferably between 30 microns and 500 microns.

10. A method according to any of claims 2-9 wherein the film has a thickness of between 20 microns and 4000 microns, preferably between 20 microns and 2000 microns, more preferably between 20 microns and 500 microns, even more preferably between 20 microns and 250 microns.

11. An article comprising a sheet treated by the method of any of claims 1-10.

12. An article according to claim 11 further comprising a liner bonded to a major sheet surface.

13. An article according to claim 11-12 provided as a roll.

14. An article according to claim 11-12 provided as a separate sheet.

15 A structure which has been covered fully or in part with an article of claim 11, wherein the structure is selected from the group consisting of buildings, parts of

buildings, elevators, windows, doors, tiles, walls, partitions, furniture, signs, bill boards, artwork, vehicles.

16. A structure according to claim 15 wherein the vehicle is selected from the group consisting of buses, trains, subway-trains, automobiles.

17. Use of an article of claim 11 for providing a surface of a structure according to any of claims 15-16 with an essentially permanent anti-graffiti coating.

18. Use of an article of claim 11 for providing a surface of a structure according to any of claims 15-16 with an essentially permanent coating protecting against pollution and corrosion.

19. A method of providing a surface of a structure with a protecting coating by coating a sheet on the structure comprising the steps of

- applying a coating composition in the form of a suspension comprising particles of a polyolefin wax or of a mixture of polyolefin waxes suspended in a liquid phase to the sheet;
- evaporating said liquid phase from the applied coating composition;
- subjecting said dried, applied coating composition to a heating treatment to raise the temperature of the dried coating composition to bring said particles of a polyolefin wax or of a mixture of polyolefin waxes into a coalescing state allowing said wax particles to provide a continuous coating of the sheet; and

allowing said heat treated coating composition to consolidate to a protective coating.

20. A method according to claim 19, wherein
the sheet is consisting of a film.

21. A method according to claim 19, wherein

the sheet 1 is comprising
an adhesive layer 2 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and
a film 3 having a first major film side 4 and a second major film side, said second major film side being bonded to the first major adhesive layer side; and the coating composition being applied to said first major film side 4.

22. A method according to claim 19, wherein
the sheet 101 is comprising
an adhesive layer 102 having a first major adhesive layer side and a second major adhesive layer side which defines the bottom surface of the sheet and
two or more films 103 each having a first major film side and a second major film side; and
each film is stacked upon another film such that a second major film side of a film above is bonded to a first major film side of a film below except the lowest film in the stacked which has its second major film bonded to the first major adhesive layer side; and
the topmost film side 104 is subjected to said method of coating.

23. A method according to claim 19, wherein
the sheet 201 is comprising
two or more pairs of layers 205, each pair of layers 205 comprising
an adhesive layer 202 having a first major adhesive layer side and a second major adhesive layer side, and
a film 203 having a first major film side and a second major film side
with the second major film side being bonded to the first major adhesive layer side; and
each pair of layers 205 is stacked upon another pair of layers 205 such that a second major adhesive layer side of a pair above is bonded to a first major film side of a pair of layers 205 below; and
the topmost film side 204 is subjected to said method of coating.

24. A method according to any of claims 19-23 wherein the film further comprises one or more of the applicable substances selected from the group of laquer, overprint clear, clearcoat or backing, and combinations thereof, applied to a major film side.

25. A method according to any of claims 19-24 wherein the sheet has a thickness of between 20 microns and 8000 microns, preferably between 30 microns and 5000 microns, more preferably between 30 microns and 2000 microns, even more preferably between 30 microns and 500 microns.

26. A method according to any of claims 19-25 wherein the film has a thickness of between 20 microns and 4000 microns, preferably between 20 microns and 2000 microns, more preferably between 20 microns and 500 microns, even more preferably between 20 microns and 250 microns.

27. A structure which has been applied with the method of any of claims 19-26, wherein the structure is selected from the group consisting of buildings, parts of buildings, elevators, windows, doors, tiles, walls, partitions, furniture, signs, bill boards, artwork, vehicles.

28. A structure according to claim 27 wherein the vehicle is selected from the group consisting of buses, trains, automobiles, subway-trains.

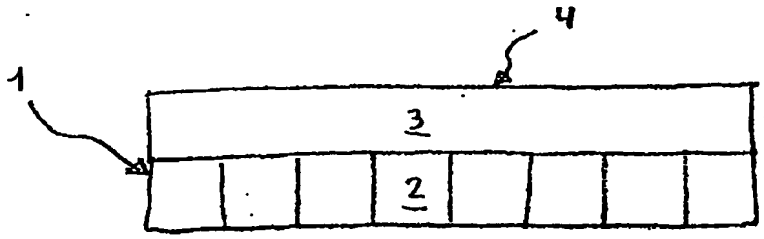
29. Use of the method of any of claims 19-26 for providing a surface of a structure according to any of claims 27-28 with an essentially permanent anti-graffiti coating.

30. Use of the method of any of claims 19-26 for providing a surface of a structure according to any of claims 27-28 with an essentially permanent coating protecting against pollution and corrosion.

ABSTRACT

A method of applying a coating of a polyolefin wax to a sheet. The application of the polyolefin wax to the sheet involves providing a coating composition comprising particles of a polyolefin wax suspended in a liquid to the sheet followed by an evaporating of the liquid and a heat treatment to bring the wax particles into a coalescing state and allowing the wax particles to provide a continuous coating of the sheet and allowing the coating to consolidate to a protective coating.

1 figurer 1



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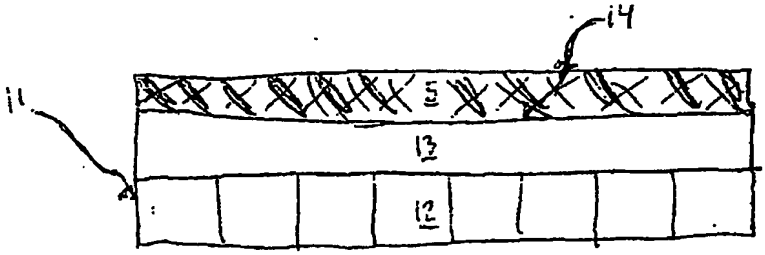

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